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ABSTRACT

This paper reviews the successful development of an educational testing system using sophisticated data processing in a developing Caribbean nation. Begun in 1975, the 4-year program was devised to assist in the creation of a multi-national testing agency which would replace the existing British Overseas Examinations with an indigenous assessment program more representative of local curricula, syllabuses, and culture. Moreover, the system would replace manual methods with high technology data processing methods. The program was executed in three phases: a feasibility phase encompassing goals establishment, systems analysis, and preliminary design; a second stage involving goal re-evaluation, physical design simulation, and testing; and a third phase involving the implementation of an error free, high-volume-tuned testing system. Problem areas encountered were work force instability, unavailability of personnel resources, lack of computer hardware/software availability and utilization, and cross cultural anomalies. Success of the project is attributed primarily to the threat of the consequences of failure and the resultant high motivation, and secondly to the dedication of the West Indians to their cause. (RAA)

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TECHNOLOGY TRANSFER IN DP FOR EDUCATIONAL SYSTEMS

by

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Technology Transfer in DP for Educational Systems

Educational Testing Service has contracted with various Caribbean nations in the development of secondary education tests, their administration and data processing for several years. The data processing component has been a substantial part of these contracts and reflects the concern of the West Indians over their own abilities in that arena.

In one of these endeavors, the largest by far ETS has undertaken internationally, we had a request to develop a four-year plan to assist in the creation of a multi-national testing agency which would replace the British Overseas examinations with an indigenous assessment program that represents more accurately, their curricula, their syllabusses and their culture.

The scope of the program unfolded slowly from 1975 to the present but took the form of 3/4 of a million dollars in education services and products from ETS. Our jointly-developed goals changed dramatically from the onset of the control to today. The evaluation of the goals and strategies from the start in 1975 taught us some painful and expensive lessons in technology transfer.

There were three identifiable stages to the project. In the first stage we were all wondering if it was doable - a feasibility stage. Our joint goals were:

- to establish competency in the new agency in systems analysis and design and programming as they are required in educational assessment projects.
- to jointly design a processing system which maximizes usage of local equipment, meets anticipated production schedules, facilitates system transition from the U .S. to the Caribbean and allows the flexibility for growth while it maintains the fundamental wisdom of simplicity.
- to allow no mistakes in the first administration year.

The strategy we employed to meet these goals was first, design and extensively document a basic test administration system, phase by phase, with the agency's new data processing staff observing and contributing as substantially as possible. Second, simulate the entire system on a large representative sample of students in all countries the year before the first administration and then operate the program (process the system) in the Caribbean, turnkey. Third, augment the skills of agency staff with formal and informal training programs in areas designated as prime importance (in our case statistical inference).

Then we went through the traditional feasibility routines and produced a logical design of the system, proposed schedules of resource usage with PERT and CPM, activity lists, and computing needs. It was possible . . . it is always possible.

The physical design stage began; we developed programs for the simulation, and tested the system in the U.S. and then tested it in the Carribean with the sample chosen. It worked up to a point and stopped. ETS was simulating the processing system we thought we designed, the agency was simulating the test administration they designed. They weren't the same. We set out to find the holes in the design, they were for the most part in people communications. The technology, so far, was up to the task, the people were not.

New goals were set - stage II. Essentially they were to modify the system to perform the data processing major operations in Princeton. To do so in the most economical way but create a processing system that is 100% accurate and foolproof - and one that is understood by those responsible for administering it.

Most of the parts in the system were modified to process testing instruments in the data processing environment of ETS, ie. in quick-turnaround, high-volume high-technology. No activities were directed towards ease of system transition to the Caribbean or in providing training to agency staff. The system that resulted registered exam candidates; established and stocked test centers; supplied the resources and tools to manage the administration; received, transcribed, and edited the test instruments; scored and printed the test results and performed all of the statistical analysis for the exams.

The third stage is really what happened . . . what goals did we meet. ETS executed a contract that produced an error-free, high-volume-tuned testing system and implemented it. The agency is now preparing to modify that system to fit their own data processing environment for 1980.

That isn't bad but we lost a lot of desirable goals back there. The reasons are many, all related to technology transfer.

Problem Areas

1. The instability of the work force - during the 4 year project our client, as a group, grew from 7 or 8 people in 1975 to over 50 in 1979. The administrative head changed twice, the analyst we had left mid-stream, and large gaps of time existed with no one minding the store.

2. The unavailability of personnel resources - if you're extremely fortunate you can fill a technical position in about 6 months. You may need to send them to the U.S. or the United Kingdom for a few months to train them after recruitment. The project suffered through this.

3. Lack of computer hardware/software availability and utilization - we looked at major commericial and governmental installations, and talked to the movers and the shakers in Jamaica, Trinidad, Guyana, and Barbados. Most organizations had contemporary equipment, but were not using them near potential. Systems programmers were rare in IBM 370 shops. Operating systems were usually maintained or tuned by IBM company System Engineers, not client staff. Down time percentages and duration are incredible (due mostly to power failures). Optical scanners were all but non-existant - ones that were around were very old and in constant need of unavailable parts. We did a computer vendor evaluation. At the time IBM and ICL were the major condendors for a purchase/lease contract in the small to medium category of main frame. Burroughs was considered but their response to a bid offer came too late. We developed a 40 point evaluation instrument with weights assigned to components as we felt met the agencies' needs.

The study was finished, the computer was ordered, and then canceled, but the important point was that we did not review equipment recently released. The models offered were usually those being replaced in the U.S. and Europe.

The interesting part of this story is the unending battle between those who are ensconced in the status and prestige of elaborate computing equipment and the pragmatists who believe that 1000 people can do it by hand. One side, we weigh the realities of the schedule vs. the cost to process. On the other, the force of the unemployment statistics, (not to mention the balance of payments) bears heavily on each purchase decision point. The prime objective in this project was, and still is, to create a self-sufficent testing agency in the Carribean - to train their staff to manage and control their project. Introducting sophisticated and extremely complex computers and software is only trading one dependency (on British exams) for another (continuing technological assistance from computer vendors).

4. Cross-cultural anomalies - distrust of North American technicians and other professionals sometimes interfered with critical communication. They didn't believe us. We didn't understand their way of life - which was of course, determines their way of business. Of course, the distrust is expected. Remnants from neo-colonialism are still kept alive by unethical or perhaps just uninformed technicians from developed countries who tend to undermine the work of others for their own profit or self-aggrandizement. Also among the involved countries, rivalries and status - seeking by interest groups caused delays and confusion at almost every decision point in the devlopment of the agency.

In light of all these problems, what then made it work? First, and most important, was simply the threat of the consequence of failure. The level of motivation was incredible. People actually worked for weeks at a time without seeing their families. Ninety hour weeks were common. Secondly was, I believe, a sincere dedication by the West Indians to their cause. They willed it to work and it did.

Thirdly, and this is the point of the paper, it worked because a great deal of thought was given by the consultants involved in what is appropriate technology. How much do you suggest, where do you insist or refuse? What is the consultant's role? Developing countries, at least in the Caribbean, have their own past, their own present and their own future which we cannot understand or appreciate in the short time we have to share experiences with them. The technology must match the social and cultural order or be rejected. I think we recognized this early and approached the transfer in that context. We talked to experienced consultants working the area. Took the time to listen and assimilate the business environment into our own methods and tools. We respected their achievement and motivation to bring order and consistency to a higherto disorganized and underrepresentative educational evaluation program.